from N. 43° 56′, W. 56° 02′ to Chebucto, N. S. 22d, heavy close-packed ice moved south off Saint John's, N. F. 22d, s. s. "Milanese," in N. 42° 30′, W. 50° 37′, saw field ice to the northward; s. s. "Panama," Cape Race bearing twenty miles northwest, passed an enormous iceberg and a large ice-field. 29th, heavy close-packed ice moved south off Saint John's N. F. While the general drift of the ice reported off Newfoundland was southerly, during the prevalence of strong easterly winds in the middle portion of the month it packed in close to the shore, blocking vessels until dispersed by westerly winds. Interspersed with the field ice many icebergs were observed. As compared with February, 1888, field ice was reported about two degrees farther south, while the eastern limit was over one degree farther west.

Compared with the record for corresponding months of previous years, the quantity of ice reported for March, 1888, was greatly deficient; the southernmost ice encountered was about one and one-half degrees north of the average southern limit, and the easternmost ice was more than three degrees west of the average eastern limit. Reports do not show that a general breaking up of ice massed along the Labrador coast had occurred by the close of the month, or that vessels had effected the passage of Belle Isle Strait, which facts indicate an unusual delay in the annual southern movement of the Arctic ice-fields.

The following table shows the southern and eastern limits of the region within which icebergs or field ice were reported for March during the last six years:

| Southern limit. | | | Eastern limit. | | |
|---|---|---|---|---|---|
| Month. | Lat. N. | Long. W. | Month. | Lat. N. | Long. W. |
| | ° ′ | ° ′ | | ° ′ | ° ′ |
| March, 1882 | 42 30 | 50 00 | March, 1882 | 46 30 | 46 00 |
| March, 1883 | 41 46 | 49 48 | March, 1883 | 48 40 | 43 03 |
| March, 1884 | 41 20 | 54 06 | March, 1884 | 45 00 | 40 15 |
| March, 1885 | 40 55 | 49 04 | March, 1885 | 45 57 | 43 15 |
| March, 1886 | 40 20 | 49 02 | March, 1886 | 47 20 | 44 40 |
| March, 1887 | 41 00 | 49 07 | March, 1887 | 45 31 | 42 56 |
| March, 1888 | 42 30 | 50 37 | March, 1888 | 47 23 | 46 56 |

## FOG.

The limits of fog-belts to the westward of the fortieth meridian are shown on chart i by dotted shading.

As compared with the chart for February, 1888, the limits of the Newfoundland fog-belt have extended about two degrees southward and eastward, and the number of days during which fog prevailed, sixteen, was one less than the aggregate number of foggy days reported for the preceding month. To the westward of the Grand Banks fog was less frequently encountered, and the southern limit was about the same, except along the coast, where it was about three degrees farther north than in February. With the exception of the 27th and 28th, when northeast winds and high barometer prevailed, the development of fog near Newfoundland attended the approach or passage of cyclonic areas. On the six days for which fog was reported between the fifty-seventh and sixty-fifth meridians, cyclonic areas were central either to the southeast of Nova Scotia or over the Gulf of Saint Lawrence. On the six dates during which fog prevailed along the coast of the United States, the winds were south to east, with falling barometer, except in one instance, when they were northwesterly. A study of the meteorological conditions which attended the development of fog west of the fortieth meridian during March, 1888, shows its dependence upon the cyclonic circulation of winds. In this, as in all preceding months for which fog reports have been received, an observable feature is the almost absolute certainty with which the presence of fog can be anticipated in the vicinity of Newfoundland, following a shift of wind to the south and east quadrants, with the approach of an area of low barometric pressure; its disappearance, with west to north winds, consequent upon the advance of a cyclonic area to the eastward of the Banks, is in a like degree observable.

The following are the limits of fog-areas on the north Atlantic Ocean during March, 1888, as reported by shipmasters:

| Date. | Vessel. | Entered. | | | Cleared. | | |
|---|---|---|---|---|---|---|---|
| | | Lat. N. | Lon. W. | Time. | Lat. N. | Lon. W. | Time. |
| | | ° ′ | ° ′ | | ° ′ | ° ′ | |
| 3 | Fog at Saint John's, N. F. | | | | | | |
| 3 | S. S. State of Texas | 38 12 | 74 28 | 4 a. m. | 37 03 | 74 56 | 9 a. m. |
| 4-5 | Fog at Saint John's, N. F. | | | | | | |
| 5-6 | S. S. Duke of Buckingham | 43 32 | 50 05 | 6 p. m | 44 04 | 48 08 | 2 a. m. |
| 13 | S. S. Rugia | 41 30 | 50 53 | 6.24 a. m. | 41 30 | 50 01 | |
| 14 | S. S. Stockholm City | 42 32 | 65 00 | | 42 27 | 63 50 | |
| 15 | S. S. Stockholm City | 42 20 | 60 30 | | 42 18 | 59 54 | |
| 15 | Fog at Saint John's, N. F. | | | | | | |
| 15 | S. S. Oxford | 41 47 | 47 56 | 10.12 a. m. | 42 07 | 46 35 | 6.06 p. m. |
| 15-16 | S. S. LaBourgogne | 44 42 | 51 17 | 11 p. m | 43 48 | 55 21 | 9 a. m. |
| 16 | S. S. Servia | 43 15 | 48 50 | 2.46 a. m. | 42 54 | 50 13 | 7.15 a. m. |
| 16 | S. S. Brooklyn City | 43 15 | 49 20 | 9 p. m | 43 17 | 48 40 | 11 p.m. |
| 18 | S. S. Stockholm City | 43 50 | 49 25 | | 44 10 | 47 58 | |
| 21 | S. S. Pennland | 40 39 | 46 44 | 9 p. m | 40 40 | 46 31 | 10 p. m. |
| 21 | S. S. Eider | Off Fire Island. | | | | | |
| 21 | S. S. Persian Monarch | 42 20 | 69 00 | 10 a. m. | 42 20 | 70 20 | 8 p. m. |
| 21-22 | S. S. Zeeland | 40 45 | 47 50 | Midnight. | 40 40 | 48 15 | 2 a. m. |
| 22 | S. S. Thingvalla | 42 54 | 52 40 | | 43 08 | 51 53 | |
| 22 | S. S. Indiana | 41 17 | 47 07 | 2.58 a. m. | 41 03 | 47 37 | 5.28 a. m. |
| 22-23 | S. S. Australia | 44 19 | 48 04 | 8 p. m. | 43 10 | 52 00 | Noon. |
| 22-23 | S. S. Buffalo | 42 11 | 53 57 | 11 p. m | 42 10 | 54 25 | |
| 22-24 | S. S. Alcides | 47 30 | 42 15 | 11 p. m | 43 40 | 51 00 | 6 p. m. |
| 22-24 | S. S. Bothnia | 41 50 | 63 00 | 4 p. m | 41 45 | 64 20 | 7 p. m. |
| 23 | S. S. LaBretagne | 42 24 | 57 06 | 9.30 a. m. | 42 20 | 57 32 | 10.30 a. m. |
| 23 | S. S. Norwegian | 42 00 | 49 46 | | 42 10 | 50 00 | |
| 23-24 | S. S. Lake Ontario | 45 30 | 45 00 | 8 a. m | 43 00 | 52 00 | 8.32 a. m. |
| 23-24 | S. S. State of Nebraska | 46 26 | 44 10 | Noon. | 43 22 | 51 33 | 7 p. m. |
| 24 | S. S. Thingvalla | 47 19 | 43 27 | | 48 32 | 41 58 | |
| 24 | S. S. Italy | 43 43 | 48 17 | 8.33 a. m. | 43 06 | 50 47 | 11.08 p. m. |
| 24 | Fog at Saint John's, N. F. | | | | | | |
| 24 | S. S. Mareca | 40 28 | 48 48 | 8 a. m. | 40 34 | 48 16 | 11.45 a. m. |
| 26-28 | Bg. Energy | 40 13 | 71 57 | 8 a. m | 40 33 | 71 51 | 4 a. m. |
| 27 | S. S. Republic | 43 38 | 48 36 | 3.30 p. m. | 43 20 | 50 22 | 8.15 p. m. |
| 27 | S. S. Holland | 40 35 | 70 00 | 9 a. m | New York. | | |
| 27-28 | S. S. City of Washington. | 36 25 | 74 35 | 3 p. m | Staten Island. | | |
| 27-28 | S. S. Lorenzo D. Baker | 36 50 | 72 20 | 10 p. m | 40 01 | 72 11 | 9 a. m. |
| 28 | S. S. LaChampagne | 46 08 | 40 31 | 3.34 a. m. | 45 55 | 41 19 | 5.30 a. m. |
| 28 | do | 45 30 | 42 55 | 9.50 a. m. | 45 24 | 43 19 | |
| 28 | S. S. Italy | 41 07 | 66 15 | 4.20 a. m. | 40 39 | 68 49 | 7.52 p. m. |
| 28 | S. S. Iowa | 42 22 | 66 11 | 10.30 a. m. | 42 23 | 70 35 | 11.40 p. m. |
| 28-29 | S. S. Waesland | 40 25 | 65 22 | 10.30 a. m. | 40 28 | 72 20 | 3.30 p. m. |
| 28-29 | S. S. Lorenzo D. Baker | Vineyard Sound. | | | Nantucket Shoals. | | |
| 29 | S. S. Italy | 40 22 | 70 59 | 6.13 a. m. | 40 17 | 72 26 | 12.50 p. m. |
| 29 | S. S. Zaandam | 41 06 | 64 00 | | 41 03 | 65 04 | |
| 29 | S. S. Republic | 41 50 | 61 45 | 8 a. m. | 41 40 | 63 10 | 1.50 p. m. |
| 29 | S. S. British Princess | 41 06 | 49 05 | 1 a. m | 41 02 | 49 17 | 2 a. m. |
| 30 | S. S. Erin | 42 46 | 49 29 | | 42 31 | 50 56 | |
| 30 | S. S. Vaderland | 41 17 | 49 54 | 0.30 a. m. | 41 11 | 50 23 | 2.30 a. m. |

## TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

The distribution of mean temperature over the United States and Canada for March, 1888, is exhibited on chart ii by dotted isothermal lines. In the table of miscellaneous data are given the monthly mean temperatures, with the departures from the normal, for the various stations of the Signal Service. The figures opposite the names of the geographical districts in the columns for mean temperature, precipitation, and departures from the normal, show respectively the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal, and subtracting when above.

March, 1888, was colder than the average over nearly the whole country, and in the northern districts from the Lake region westward to the Rocky Mountains the month was comparatively a remarkably cold one, the monthly mean temperatures ranging from 4° to 10° below the normal; a marked departure from the normal temperature also occurred in the middle and southern Rocky Mountain slopes. In the other districts, where the temperature was below normal, the departures were not marked. In the extreme northern portion of New England and the adjacent Canadian Provinces the month was considerably warmer than the average; the contrast between the temperature conditions of these districts and those lying immediately to the westward forms a noteworthy feature, Albany, N.

Y., showing 6° below the normal, and Chatham, N. B., 7° above. On the Pacific coast, in the south Atlantic states, and from the Ohio River southward to the Gulf, the temperature departures, while below the normal, were not marked, being less than 1° at many stations, particularly on the Pacific coast.

It will be seen from the table of maximum and minimum temperatures that during March, 1888, the minimum temperatures were the lowest that have yet been recorded at numerous stations in the Missouri Valley, northern slope, and north Pacific coast region, and at a few other stations located in the following states, viz., Virginia, Arkansas, and California. But one station reports a maximum temperature higher than any previously recorded, viz., Fort Elliott, Tex., 87°, which is 1° higher than any former record. At Lynchburg, Va., and Charlotte, N. C., the maximum temperatures were within half a degree of the highest on the records of those stations.

*Table of comparative maximum and minimum temperatures for March.*

| State or Territory. | Stations. | For 1888. | | Since establishment of station. | | | | Length of record. |
|---|---|---|---|---|---|---|---|---|
| | | Max. | Min. | Max. | Year. | Min. | Year. | |
| | | ° | ° | ° | | ° | | Yrs. |
| Alabama | Mobile | 75.5 | 35.0 | 85.0 | 1879 | 29.0 | 1885 | 18 |
| Do | Montgomery | 82.1 | 30.8 | 86.3 | 1882 | 25.0 | 1873 | 16 |
| Arizona | Prescott | 69.0 | 5.0 | 90.0 | 1879 | — 8.0 | 1876 | 12 |
| Do | Fort Apache | | | 83.0 | 1879 | 11.0 | 1881 | 10 |
| Arkansas | Fort Smith | 83.6 | 23.0 | 82.8 | 1884 | 23.5 | 1884 | 6 |
| Do | Little Rock | 80.5 | 25.2 | 83.0 | 1882 | 23.0 | 1886 | 9 |
| California | San Francisco | 73.7 | 38.0 | 78.0 | 1887 | 39.0 | 1880 | 18 |
| Do | San Diego | 72.0 | 41.0 | 99.0 | 1879 | 38.0 | 1880 | 17 |
| Colorado | Denver | 70.0 | — 1.5 | 81.0 | 1879 | —10.7 | 1886 | 16 |
| Do | Montrose | 66.0 | 6.9 | 72.5 | 1887 | 7.2 | 1886 | 4 |
| Connecticut | New Haven | 55.0 | 5.0 | 69.0 | 1880 | — 0.2 | 1885 | 16 |
| Do | New London | 58.0 | 12.0 | 64.0 | 1878 | 4.0 | 1884 | 16 |
| Dakota | Fort Buford | 51.0 | —27.8 | 70.0 | 1879 | —23.0 | 1880 | 10 |
| Do | Yankton | 69.2 | —17.5 | 87.0 | 1879 | —16.0 | 1880 | 15 |
| Dis. of Columbia | Washington City | 75.6 | 10.0 | 79.0 | 1880 | 4.0 | 1873 | 18 |
| Florida | Jacksonville | 83.5 | 35.0 | 88.0 | 1882 | 31.0 | 1873, 1876 | 17 |
| Do | Key West | 81.8 | 58.4 | 89.0 | 1873, 1874 | 53.0 | 1886 | 18 |
| Georgia | Atlanta | 77.3 | 24.0 | 81.0 | 1882 | 20.4 | 1885 | 10 |
| Do | Savannah | 78.5 | 32.0 | 87.0 | 1882 | 27.0 | 1873 | 18 |
| Idaho | Boisé City | 66.0 | 17.7 | 76.0 | 1881 | 9.0 | 1872 | 11 |
| Illinois | Cairo | 76.2 | 21.0 | 84.0 | 1879 | 10.0 | 1873 | 17 |
| Do | Chicago | 64.0 | — 0.9 | 73.0 | 1875 | —12.0 | 1873 | 16 |
| Indiana | Indianapolis | 69.0 | 8.8 | 77.0 | 1875 | 3.2 | 1885 | 15 |
| Indian Ter | Fort Sill | 86.5 | 19.7 | 95.0 | 1879 | 10.0 | 1880 | 11 |
| Iowa | Dubuque | 57.5 | — 4.6 | 75.0 | 1875 | —10.0 | 1875 | 15 |
| Do | Des Moines | 72.9 | — 4.6 | 80.0 | 1880 | — 5.6 | 1884 | 10 |
| Kansas | Dodge City | 75.0 | — 1.8 | 89.0 | 1879 | — 8.0 | 1880 | 15 |
| Do | Leavenworth | 78.5 | 10.8 | 84.0 | 1879 | 2.0 | 1876 | 17 |
| Kentucky | Louisville | 73.5 | 13.8 | 79.3 | 1887 | 3.0 | 1873 | 16 |
| Louisiana | New Orleans | 78.0 | 40.7 | 84.0 | 1879 | 36.0 | 1885 | 18 |
| Do | Shreveport | 81.0 | 32.5 | 90.0 | 1882 | 26.0 | 1876 | 15 |
| Maine | Eastport | 48.0 | 3.9 | 53.0 | 1878 | — 7.9 | 1886 | 15 |
| Do | Portland | 47.1 | 7.3 | 65.0 | 1874 | — 7.0 | 1872 | 17 |
| Maryland | Baltimore | 73.5 | 12.0 | 76.0 | 1880 | 5.0 | 1873 | 16 |
| Massachusetts | Boston | 57.5 | 11.8 | 72.0 | 1880 | — 7.5 | 1872 | 18 |
| Michigan | Marquette | 40.4 | —13.8 | 70.0 | 1878 | —16.0 | 1884 | 14 |
| Do | Grand Haven | 63.7 | 1.0 | 71.0 | 1878 | — 4.9 | 1885 | 16 |
| Minnesota | Saint Vincent | 40.7 | —29.3 | 49.0 | 1881 | —31.0 | 1883 | 8 |
| Do | Saint Paul | 42.0 | —13.7 | 68.0 | 1879 | —22.5 | 1873 | 16 |
| Mississippi | Vicksburg | 83.5 | 31.2 | 85.0 | 1878, 1880 | 27.0 | 1885 | 16 |
| Missouri | Saint Louis | 76.0 | 14.0 | 82.0 | 1879 | 8.0 | 1876 | 18 |
| Montana | Ft. Assinaboine | 60.2 | —26.0 | 68.2 | 1885 | —25.8 | 1884 | 8 |
| Do | Helena | 63.5 | —13.0 | 67.4 | 1887 | —10.0 | 1886 | 8 |
| Nebraska | North Platte | 74.0 | —13.7 | 86.0 | 1879 | —21.0 | 1880 | 14 |
| Do | Omaha | 78.3 | 3.9 | 82.0 | 1879 | — 7.0 | 1880 | 16 |
| Nevada | Winnemucca | 70.7 | 10.0 | 82.0 | 1879 | — 3.0 | 1882 | 11 |
| New Jersey | Atlantic City | 69.5 | 10.0 | 72.0 | 1880 | 8.0 | 1884 | 15 |
| New Mexico | Santa Fé | 64.0 | 14.0 | 82.0 | 1879 | 0.0 | 1880 | 16 |
| New York | Buffalo | 63.0 | 1.6 | 72.0 | 1875 | — 4.1 | 1885 | 16 |
| Do | New York City | 62.9 | 4.8 | 72.0 | 1879 | 3.0 | 1873 | 17 |
| North Carolina | Charlotte | 79.3 | 20.0 | 79.7 | 1887 | 23.0 | 1884 | 10 |
| Do | Wilmington | 76.5 | 24.4 | 84.0 | 1878 | 20.0 | 1873 | 18 |
| Ohio | Cincinnati | 70.9 | 12.3 | 77.0 | 1875 | 1.0 | 1873 | 18 |
| Do | Sandusky | 71.6 | 6.1 | 76.0 | 1880 | — 3.4 | 1885 | 11 |
| Oregon | Portland | 67.5 | 24.5 | 79.0 | 1886 | 25.5 | 1880 | 15 |
| Do | Roseburg | 71.2 | 23.0 | 81.0 | 1887 | 19.0 | 1880 | 11 |
| Pennsylvania | Pittsburg | 71.5 | 9.1 | 80.0 | 1876 | 2.0 | 1877 | 15 |
| Do | Philadelphia | 70.0 | 8.2 | 75.0 | 1880 | 5.0 | 1872 | 18 |
| Rhode Island | Block Island | 51.7 | 14.6 | 56.0 | 1886 | 5.8 | 1886 | 8 |
| South Carolina | Charleston | 74.0 | 29.5 | 85.0 | 1882 | 28.0 | 1876 | 15 |
| Tennessee | Knoxville | 76.4 | 19.0 | 83.0 | 1882 | 6.0 | 1873 | 18 |
| Do | Memphis | 80.0 | 28.0 | 85.0 | 1879 | 18.0 | 1876 | 16 |
| Texas | Brownsville | 85.0 | 45.1 | 92.3 | 1884 | 35.0 | 1880 | 13 |
| Do | Fort Elliott | 87.2 | 8.6 | 86.0 | 1880 | — 2.0 | 1880 | 9 |
| Utah | Salt Lake City | 68.5 | 19.0 | 77.0 | 1879 | 4.0 | 1874 | 15 |
| Virginia | Lynchburg | 80.1 | 16.5 | 80.6 | 1887 | 16.0 | 1884 | 15 |
| Do | Norfolk | 76.8 | 14.1 | 81.0 | 1880 | 16.0 | 1872 | 18 |
| Washington | Spokane Falls | 62.1 | 11.9 | 74.0 | 1881 | 7.0 | 1882 | 8 |
| Do | Olympia | 64.8 | 23.0 | 71.0 | 1881 | 23.0 | 1880 | 11 |
| Wisconsin | La Crosse | 48.8 | — 9.7 | 72.0 | 1875 | —23.0 | 1873 | 16 |
| Do | Milwaukee | 60.5 | — 2.3 | 70.0 | 1878 | — 8.5 | 1884 | 18 |
| Wyoming | Cheyenne | 64.2 | — 4.8 | 77.0 | 1879 | —17.0 | 1880 | 16 |

## DEVIATIONS FROM NORMAL TEMPERATURES.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperatures for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for March, 1888; (4) the departures of the current month from the normal; (5) and the extreme monthly means for March during the period of observations and the year of occurrence:

| State and Station. | County. | (1) Normal for the month of March. | (2) Length of record. | (3) Mean for March, 1888. | (4) Departure from normal. | (5) Extreme monthly mean temperature for March. | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Highest. | | Lowest. | |
| | | | | | | Am't. | Year. | Am't. | Year. |
| *Arkansas.* | | ° | Years | ° | ° | ° | | ° | |
| Lead Hill | Boone | 43.6 | 6 | 46.2 | +2.6 | 55.3 | 1882 | 45.5 | 1885 |
| *California.* | | | | | | | | | |
| Sacramento | Sacramento | 54.4 | 22 | 50.7 | —3.7 | 59.1 | 1877 | 46.1 | 1880 |
| Salinas | Monterey | 50.7 | 16 | 50.2 | —0.5 | | | | |
| *Florida.* | | | | | | | | | |
| Merritt's Island | Brevard | 65.0 | 5 | 65.0 | 0.0 | 69.6 | 1884 | 63.2 | 1885 |
| *Illinois.* | | | | | | | | | |
| Golconda | Pope | 45.6 | 10 | 43.4 | —2.2 | | | | |
| Peoria | Peoria | 38.2 | 32 | 37.1 | —1.1 | | | | |
| Riley | McHenry | 29.8 | 27 | 26.1 | —3.7 | | | | |
| *Indiana.* | | | | | | | | | |
| Blue Lick | Clark | 42.6 | 11 | 39.9 | —2.7 | | | | |
| Logansport | Cass | 41.1 | 33 | 34.8 | —6.3 | | | | |
| Spiceland | Henry | 37.0 | 34 | 35.3 | —1.7 | | | | |
| Vevay | Switzerland | 42.8 | 21 | 39.8 | —3.0 | | | | |
| *Iowa.* | | | | | | | | | |
| Cresco | Howard | 25.2 | 16 | 19.6 | —5.6 | | | | |
| *Kansas.* | | | | | | | | | |
| Lawrence | Douglas | 41.6 | 20 | 38.6 | —3.0 | 51.2 | 1868 | 34.2 | 1876 |
| Wellington | Sumner | 43.5 | 10 | 42.6 | —0.9 | 49.6 | 1879 | 39.0 | 1883 |
| *Louisiana.* | | | | | | | | | |
| Point Pleasant | Tensas | 56.7 | 8 | 54.6 | —2.1 | | | | |
| Grand Coteau | Saint Landry | 61.1 | 6 | 59.6 | —1.5 | | | | |
| *Maine.* | | | | | | | | | |
| Gardiner | Kennebec | 29.5 | 52 | 28.9 | —0.6 | 35.0 | 1842 | 20.8 | 1885 |
| *Maryland.* | | | | | | | | | |
| Cumberland | Alleghany | 37.3 | 16 | 35.7 | —1.6 | 46.0 | 1878 | 30.0 | 1875 |
| *Massachusetts.* | | | | | | | | | |
| Somerset | Bristol | 34.0 | 18 | 32.4 | —1.6 | | | | |
| Worcester | Worcester | 33.0 | 50 | 27.8 | —5.2 | 40.7 | 1842 | 23.3 | 1885 |
| *Nevada.* | | | | | | | | | |
| Carson City | Ormsby | 40.9 | 9 | 40.6 | —0.3 | 47.2 | 1885 | 33.5 | 1880 |
| *Michigan.* | | | | | | | | | |
| Thornville | Lapeer | 30.5 | 12 | 26.8 | —3.7 | | | | |
| Kalamazoo | Kalamazoo | 31.3 | 13 | 27.8 | —3.5 | | | | |
| *New Jersey.* | | | | | | | | | |
| Moorestown | Burlington | 37.4 | 25 | 32.9 | —4.5 | 45.4 | 1871 | 29.7 | 1885 |
| South Orange | Essex | 35.6 | 18 | 30.6 | —5.0 | 42.5 | 1878 | 28.8 | 1872 |
| *New York.* | | | | | | | | | |
| North Volney | Oswego | 27.8 | 21 | 23.1 | —4.7 | 18.6 | 1885 | 37.4 | 1878 |
| Palermo | Oswego | 27.5 | 35 | 22.6 | —4.9 | 38.0 | 1878 | 17.1 | 1885 |
| *Ohio.* | | | | | | | | | |
| Wauseon | Fulton | 32.4 | 18 | 29.7 | —2.7 | 43.2 | 1878 | 24.5 | 1885 |
| *Oregon.* | | | | | | | | | |
| Albany | Linn | 47.0 | 9 | 46.1 | —0.9 | | | | |
| *Pennsylvania.* | | | | | | | | | |
| Dyberry | Wayne | 28.7 | 24 | 23.4 | —5.3 | 37.5 | 1878 | 19.5 | 1885 |
| Grampian Hills | Clearfield | 30.1 | 24 | 28.1 | —2.0 | 40.0 | 1878 | 20.1 | 1885 |
| *South Carolina.* | | | | | | | | | |
| Statesburg | Sumter | 53.0 | 8 | 51.7 | —1.3 | 59.0 | 1882 | 48.3 | 1885 |
| *Tennessee.* | | | | | | | | | |
| Milan | Gibson | 47.0 | 6 | 47.0 | 0.0 | | | | |
| *Texas.* | | | | | | | | | |
| New Ulm | Austin | 62.6 | 16 | 57.3 | —5.3 | 62.4 | 1879 | 57.3 | 1888 |
| *Vermont.* | | | | | | | | | |
| Strafford | Orange | 25.8 | 14 | 23.2 | —2.6 | 38.8 | 1878 | 17.1 | 1883 |
| *Virginia.* | | | | | | | | | |
| Bird's Nest | Northampt'n | 46.2 | 19 | 39.3 | —6.9 | 54.1 | 1878 | 37.6 | 1872 |
| Variety Mills | Nelson | 43.7 | 11 | 40.5 | —3.2 | 51.6 | 1878 | 37.1 | 1885 |
| Wytheville | Wythe | 42.4 | 24 | 41.3 | —1.1 | 49.0 | 1878 | 37.0 | 1870, '72, 1881, '85 |
| *West Virginia.* | | | | | | | | | |
| Helvetia | Randolph | 39.0 | 12 | 37.7 | —1.3 | | | | |

## RANGES OF TEMPERATURE.

The monthly and the greatest and least daily ranges of temperature at Signal Service stations are given in the table of miscellaneous meteorological data. In the Missouri Valley and northern Rocky Mountain slope the monthly ranges generally varied from 80° to 90°, the greatest, 93°, occurring at Crete, Nebr., and Fort Custer, Mont. As usual, the ranges were least at stations along the Gulf and Pacific coasts, where they were below 40°; Key West, Fla., reporting the least, 23°.

## FROST.

Frosts were of daily occurrence in some part of the country throughout the month; they were most extensive about the 10th and least between the 25th and the close of the month. Some damage resulted from the frost of the 23d, principally in the south Atlantic states. In the Southern States frost occurred as follows:

*Alabama.*—Newton, 23d; Montgomery, 7th, 8th, 13th, 15th, 23d.

*Florida.*—Jacksonville, 12th, 15th; Pensacola, 6th; Cedar Keys, 12th.

*California.*—Los Angeles, 1st; Riverside, 1st, 2d, 4th, 6th.

*Georgia.*—Quitman, 8th, 14th, 15th, 23d.

*Louisiana.*—Alexandria, 10th, 19th, 24th to 26th; New Orleans, 8th, 13th, 14th.

*Mississippi.*—University, 12th, 13th, 15th; Vicksburg, 7th, 8th, 11th to 13th, 22d.

The following reports of destructive frosts have been received:

Charlotte, N. C.: the peach crop was reported to have been injured by the cold weather on the 23d.

Aiken, Aiken Co., S. C.: the frost of the 23d caused serious injury to the fruit crop; vegetation generally was damaged.

Savannah, Ga.: truck farmers report that the heavy frost on the 23d damaged vegetables to some extent.

Milledgeville, Baldwin Co., Ga.: the cold wave on the 23d was very destructive to tender vegetation; the peach crop was injured to a great extent.

Springfield Mo.: the peach buds were very much damaged by the frost on the 22d.

### TEMPERATURE OF WATER.

The following table shows the temperature of the sea-water for March, 1888, observed, under conditions as given, at the harbors of the several stations; the monthly range of water temperature; the average depth at which the observations were made, and the mean temperature of the air:

| Station. | Temperature at bottom. | | | | Mean temperature of air at the station. | Average depth of water in feet and tenths. |
|---|---|---|---|---|---|---|
| | Max. | Min. | Range. | Monthly mean. | | |
| | ° | ° | ° | ° | ° | |
| Canby, Fort, Wash | | | | | | |
| Cedar Keys, Fla | 71.0 | 56.0 | 15.0 | 63.5 | 61.4 | 8.2 |
| Charleston, S. C | 62.5 | 49.5 | 13.0 | 53.6 | 55.2 | 34.3 |
| Eastport, Me | 34.5 | 32.2 | 2.3 | 33.4 | 29.0 | 16.5 |
| Galveston, Tex | 65.5 | 53.0 | 12.5 | 61.2 | 60.1 | 14.9 |
| Key West, Fla* | | | | | | |
| New York City | 39.3 | 29.7 | 9.6 | 32.3 | 32.0 | 14.8 |
| Pensacola, Fla | 66.8 | 57.5 | 9.3 | 61.5 | 59.5 | 17.8 |
| Portland, Me | 34.8 | 30.0 | 4.8 | 32.0 | 29.8 | 15.7 |
| Portland, Oregon | 49.5 | 43.0 | 6.5 | 46.0 | 46.2 | 51.9 |

*No thermometer at station.

## PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for March, 1888, as determined from the reports of about eight hundred stations, is exhibited on chart iv. In the table of miscellaneous meteorological data are given, for each Signal Service station, the total precipitation, with the departures from the normal. The figures opposite the names of the geographical districts in columns for mean temperature, precipitation, and departures from the normal, show respectively the average for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal, and subtracting when above.

In Florida, along the coasts of South Carolina and Georgia, in parts of the Lake region, New England, the southern slope, plateau districts, North Carolina, and Pacific coast, the precipitation of March, 1888, was below the average. No extended area of deficiency is shown, however, and, with the exception of northern Florida, where the rainfall was very light, the departures from the normal were not marked. Over much the larger portion of the country the rainfall exceeded the average for March. In portions of the east Gulf states the monthly rainfalls of more than ten inches occurred; in the west Gulf states, portions of Tennessee, Virginia, and the Carolinas, and in southern New England, the precipitation was also very heavy, being largely in the form of snow in the last-named district. On the Pacific coast the rainfall was below the average in Oregon, and above the average in California and Washington; at Portland, Oregon, only about 45 per cent. of the average amount fell, while at San Diego, Cal., it was about double the average.

### SNOW.

Only the dates of snow in Southern States are given, which are as follows:

*Arkansas.*—Fort Smith, 6th, 20th; Little Rock, 6th.

*Mississippi.*—University, 6th.

*North Carolina.*—Wash Woods, 14th, 22d.

*Texas.*—Abilene, 6th, 20th; Fort Davis, 13th; Fort Elliott, 5th, 21st, 26th, 27th.

### MONTHLY SNOWFALLS (in inches and tenths).

Monthly snowfalls of March generally ranged from 5 to 12 inches in Dakota and Nebraska, and thence eastward to the Atlantic coast, except northern Michigan, portions of New York, and in New England, where the fall was much greater. At Albany, N. Y., slightly more than 50 inches fell, and over a large part of New England the total monthly snowfalls ranged from 30 to 40 inches. In eastern Pennsylvania, northern New Jersey, and in portions of West Virginia the monthly snowfalls ranged from 20 to 30 inches. East of the Mississippi River, to the south of the thirty-fifth parallel, no appreciable amount of snow fell, and to the west of the Mississippi, none fell to the south of the parallel mentioned, except in mountain regions.

### DEPTH OF UNMELTED SNOW ON GROUND AT END OF MONTH.

[*Expressed in inches and tenths.*]

At the close of March there was no unmelted snow on the ground, except in northern districts. In Montana, Dakota, Minnesota, and northern Iowa the depth ranged from 1 to 10. In the northern portions of Michigan and Wisconsin depths ranging from 10 to 36 are reported. In Pennsylvania there was none in the southern part of the state and from 6 to 18 in the northern part. In some portions of New York, Vermont, New Hampshire, and Maine there were from 20 to 37 of snow on the ground at the end of the month, while in other portions there was very little.

### SLEET.

During March there were but few days on which sleet did not occur in some part of the country, viz., the 6th, 7th, 15th, and 16th. From the 24th to 26th severe sleet storms occurred in Illinois, Indiana, Iowa, Nebraska, and Wisconsin, concerning which these reports are given:

Springfield, Ill.: during the storm on the 24th all electric wires were heavily coated with ice, and many were broken, causing serious interruption to telegraphic communication.

Charleston, Coles Co., Ill.: the sleet storm during the night of the 24–25th damaged fruit trees to a considerable extent in this county.

Crete, Saline Co., Nebr.: the sleet storm of the 25th was the severest known for many years; much damage was done to orchards and shade trees.

Vevay, Switzerland Co., Ind.: the sleet storm of the 24–25th covered all exposed objects with a heavy coat of ice, and many trees were broken.

Dana, Vermillion Co., Ind.: the severest sleet storm of the year occurred on the 26th; trees of all kinds were injured, the smaller fruit trees sustaining the greatest damage.

### PRECIPITATION FROM A CLOUDLESS SKY.

Columbus, Ohio: snow fell from a clear sky from 9.10 to 9.25 p. m. on the 11th.

### DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for a series of years; (2) the length of record during which the observations have been taken, and from which the average has been computed; (3) the total precipitation for March, 1888; (4) the departures of the current month from the average;